

THESIS FOR THE DEGREE OF LICENTIATE OF ENGINEERING

Are you really listening to what your customers are saying?
Making use of customer feedback in the era of servitization and digitalization

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Gothenburg, Sweden 2018

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Abstract

As digitalization and servitization are transforming the customer offering, and as customers' wishes and needs are growing increasingly complex, the processes related to understanding how customers perceive the offering need to adapt accordingly. Thus, the customer feedback channels and content are impacted, creating challenges and opportunities for firms in both service and manufacturing industries. Offering digitally connected services alters the customer-firm interface, while also opening up new feedback channels into the firm. Moreover, since customer requirements are becoming more complex and market changes are occurring at an increasing rate, firms need to possess processes for gathering and utilizing customer feedback in general, and customer satisfaction information in particular. This thesis sets out to explore the use of customer feedback in the era of servitization and digitalization, in order to identify the prerequisites needed to use customer feedback for service improvements.

The thesis builds on two qualitative studies, which operationalize the purpose through the lens of customer-initiated feedback, and firm-initiated feedback. The first study explores the processes needed to understand and react upon customer-initiated feedback of digitally connected services. The second study explores the customer satisfaction information usage process, and bridges this process with the firms' service improvement processes through the use of dynamic capabilities. The findings of the thesis add to the emerging research field residing in the intersection of servitization and digitalization research, through its exploration of challenges related to using customer-initiated feedback of digitally connected services and the impact these have on the firm's established quality improvement processes. Furthermore, the thesis investigates how organizational capabilities and organizational learning can support the use of customer feedback.

Keywords: customer feedback, customer satisfaction, service improvements, servitization, digitalization, capabilities

List of appended papers

Paper 1: “Digitally connected services: Working with improvements through customer-initiated feedback processes”

Birch-Jensen, A., Gremyr, I., and Halldórsson, A. (2018)

Submitted to an academic journal. An earlier version of the paper was presented at the Nordic Academy of Management Forum, August 2017, Bodø, Norway.

Contributions: The paper was written by Birch-Jensen, Gremyr, and Halldórsson. Birch-Jensen was the lead author and initiated the study. The data collection was predominantly conducted by Birch-Jensen, and the analysis was done jointly by Birch-Jensen, Gremyr, and Halldórsson.

Paper 2: “Use of customer satisfaction measurements to drive improvements”

Birch-Jensen, A., Gremyr, I., Hallencreutz, J., and Rönnbäck, Å. (2018)

Accepted for publication, forthcoming in Total Quality Management & Business Excellence (2018).

Contributions: The paper was written jointly by Birch-Jensen and Gremyr. Birch-Jensen was lead author and initiated the study together with Gremyr and Hallencreutz. The data was collected jointly by Birch-Jensen, Rönnbäck, and supported by employees of the Swedish Institute for Quality. Birch-Jensen analyzed the data.

Paper 3: “Dynamic Capabilities for Improving Service Offerings through the Utilization of Customer Satisfaction Information”

Birch-Jensen, A., Gremyr, I., and Halldórsson, A. (2018)

Conference paper, accepted for presentation after peer-review at the 10th SERVSIG conference, June 2018, Paris, France.

Contributions: The paper was written by Birch-Jensen, Gremyr, and Halldórsson. The authors jointly contributed to the paper, but Birch-Jensen did the majority of the data collection and data analysis. Part of the data collection was carried out by employees of the Swedish Institute for Quality.

Acknowledgements

I still remember the day I realized that my dream job was to become a PhD-student. It was a sunny day (aren't they all, though?) in San Diego, California, and I was contemplating my future whilst working in the city I thought I would spend forever in. I found myself dreaming of a job where I would learn new things every day, and preferably also get the opportunity to teach others, be fiercely intellectually stimulated, have deep discussions about things such as *is there a universal truth?*, and be given the time to think, contemplate, and reflect. I suddenly realized that I was dreaming of becoming a PhD-student. Soon after this realization, I quit my job, moved back to Sweden, finished my master's and managed to land my absolute dream job. It has been a privilege each step of the way.

The road has proven both winding and challenging, but most of all extremely rewarding and full of learning. It would, however, never have been possible without the support, guidance, and help from many people around me, some of which I will mention here. First of all, warmest thanks to my supervisor, Ida Gremyr. You are an inspiration and a mentor – thank you for all your feedback, encouragement, and guidance! It has truly been invaluable. Furthermore, I also want to thank and acknowledge the firms and employees that I have had the honor to work with – without you there would be no research. Also, thank you to my co-supervisor Nina Löfberg, for guiding me into the fascinating world of servitization. To my colleagues at the department of Technology Management and Economics, thank you for including me in your research community. Especial thanks to my colleagues at the division of Service Management and Logistics – you are a great bunch! Thank you for providing everything from insightful feedback to laughter during our fika-breaks. To my office-roomie, Monika – thank you for being a sounding board and a great friend. You make even the toughest days enjoyable! To my examiner Árni Halldórsson – thank you for all your invaluable time, feedback, and new ideas! It is such a privilege to work alongside you.

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Let the second half commence!

This is for you, mormor Ulla.

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1 Introduction

In this chapter, the background of the thesis will be presented, as well as the research questions and purpose. Furthermore, limitations of the research will be discussed.

1.1 Background

The environment in which both service firms and manufacturing firms are operating is changing at an ever-increasing speed, with trends such as *servitization* and *digitalization* at the fore front of the transformation (Coreynen, Matthyssens, & Van Bockhaven, 2017). Moreover, intangible assets, such as firms' intellectual and human capital, are becoming progressively important for firms' performance and customer satisfaction (Fornell, Morgeson III, & Hult, 2016). These factors, combined with increasingly complex customer requirements (Lenka, Parida, & Wincent, 2017), have resulted in a need for processes which can gather and use customer feedback in order to improve the service offering (Lervik Olsen, Witell & Gustafsson, 2014).

The ability to gather and use customer feedback is one fundamental aspect of customer-oriented firms and considered a requirement for continuously improving the customers' satisfaction with the service offering (Lervik Olsen et al., 2014). As a response to the changes in the external environment and an attempt to increase the understanding of a firm's customers, concepts such as *customer journey* (Richardson, 2010) and *co-creation of value* (Lenka et al., 2017; Payne, Storbacka, & Krow, 2008) have been used to understand how customers assess their satisfaction with a particular service. In service industries and service research fields, these external, customer-focused concepts have been discussed for years (Halvorsrud, Kvale, & Følstad, 2016; Galvagno, & Dalli, 2014). As an increasing number of manufacturing firms are undergoing servitization, i.e. starting to offer services, or integrated product-service solutions (Lightfoot, Baines & Smart, 2013), these elusive customer-focused concepts, have started to draw attention also from the manufacturing field. *Customer focus* and *continuous improvement*, however, have been regarded as fundamental building blocks of manufacturing firms' managerial philosophy for decades now (Dean & Bowen, 1994), and the term *customer focus* has been used to describe the desired starting point of manufacturing firms' improvement efforts (Sousa, 2003; Hellsten & Klefsjö, 2000). In the context of quality management, customer focus practices entail "the establishment of links between customer needs and satisfaction and internal processes" (Sousa,

2003, p. 2). These links, however, appear to be somewhat elusive and abstract for both firms and researchers (Sousa, 2003).

On the backdrop of this dynamic setting, this research sets out to explore the use of customer feedback, in order to identify the prerequisites needed to use customer feedback for service improvements.

1.2 Problem discussion and the development of the research questions

The challenging and complex nature of the servitization-journey emphasizes the need for cross-disciplinary research on the subject (Luoto, Brax, & Kohtamäki, 2017), since adapting a servitization strategy often has an impact on many different areas of conducting business, such as e.g. innovation processes, operations, new service and/or product development, marketing, supply chain relations, and after sales services. Furthermore, as an increasing number of firms are utilizing digitalization in their servitization journey (Lenka et al., 2017), e.g. by developing and offering digital services as well as using digitalization in their internal processes, there is a need for research exploring how firms are impacted by the combination of digitalization and servitization. Thus, this research sets out to explore one aspect which lies in the intersection of digitalization and servitization: the challenges related to using personalized customer feedback of DCS.

As an increasing number of firms are offering DCS, one result is a smorgasbord of automated customer feedback collected during the customers' service usage which often is readily available for the providing firms (Porter & Heppelmann, 2014). Thus, firms, and researchers, are scrambling to understand how to make use of this codified customer feedback in order to increase customers' service experience (Ostrom, Parasuraman, Bowen, Patrício, & Voss, 2015; McAfee, Brynjolfsson, Davenport, Patil, & Barton, 2012), which in turn has the potential to increase customer satisfaction and the firm's financial performance (Eklof, Hellstrom, Malova, Parmler & Podkorytova, 2017). However, due to the inherent service elements of DCS, and the inseparability between the human and the digital (Cecez-Kecmanovic, Galliers, Henfridsson, Newell, & Vidgen, 2014), having ways of gathering and using personalized customer-initiated feedback might be of importance. With the existing focus on codified feedback, the first research question seeks to answer the challenges firms face in relation to DCS when it comes to the traditional type of service feedback, meaning personalized, customer-initiated feedback:

RQ1. What are the challenges for firms in using personalized customer-initiated feedback when aiming to improve their DCS-offering?

Second, firm-initiated feedback can take many shapes and forms – one is customer satisfaction information. Measuring customer satisfaction has become a common practice amongst many firms today (Bititci, Garengo, Dörfler & Nudurupati, 2012), since it has been shown that having satisfied customers also drives the firm's financial performance (Eklof et al., 2017). Furthermore, it has been argued that customer satisfaction is a better predictor of future financial performance, than the traditional financial performance measurements widely used (Ittner & Larcker, 1998). Even though the importance of customer satisfaction is widely accepted and understood both in theory and in practice, few studies have looked at the actual customer satisfaction information usage (Lervik Olsen et al., 2014; Morgan, Anderson & Mittal, 2005). On the backdrop of this, the second research question seeks to shed light on how the use of customer satisfaction information can be supported:

RQ2. How can service firms support the use of customer satisfaction information (CSI)?

Thus, the purpose of this thesis is to explore the use of customer feedback, in order to identify the prerequisites needed to use customer feedback for service improvements. In the scope of this thesis, *customer* refers to the end-user of the service, and *firm* refers to the service provider.

1.3 Limitations

Customer feedback can be provided through various mediums and can differ in terms of both the actors involved in the customer–firm interface and the feedback type, delivery, and content. This thesis operationalizes its purpose through two specific types of customer feedback, which originate from the following two more general customer-feedback categories: (1) customer-initiated feedback, and (2) firm-initiated feedback. Regarding the former, the research presented in this thesis has focused on the personalized customer feedback of digitally connected services (DCS), wherein the feedback is delivered through a human-human interface. Thus, codified and automated customer feedback, such as sensor data, an extensively researched topic in evaluations of digital services, is not within the scope of this research. Regarding firm-initiated feedback, the conducted study has focused on the use of *customer satisfaction information (CSI)*. The scope of the research includes the usage processes of CSI but excludes *how* customer

satisfaction is measured, i.e. the research does not analyze if the employed customer satisfaction measurements are correct or suitable for the studied firms' purposes. The processes related to customer satisfaction information usage (CSIU), are those "a firm uses to monitor, diagnose, and take action to optimize CS" (Morgan et al., 2005, p. 132). This research is explorative, as it investigates the prerequisites of utilizing customer feedback for service improvements; thus, it is not concerned with improvement processes or actual service improvements per se.

2 Frame of reference

As the purpose of this thesis focuses on exploring the use of customer feedback in order to identify prerequisites for using customer feedback for service improvements, the frame of reference builds on the areas of *customer feedback processes and systems*, and the research *context*, before exploring *working with customer feedback in the age of servitization and digitalization*.

2.1 Customer feedback processes and systems

Basing service improvements on customer feedback can affect customer satisfaction which in turn affects the firm's profitability (Fundin & Elg, 2006). Thus, having processes which can capture feedback related to the customers' experiences, is crucial for firms aiming to continuously improve their service offering (Rawson, Duncan, & Jones, 2013). Moreover, these processes need to possess the ability to transform customer feedback information into organizational knowledge (Fundin & Elg, 2006), upon which concrete improvement actions can be taken (Lervik Olsen et al., 2014). Firms customer feedback processes can either be systematic and structured, entailing standardized processes for capturing and transmitting customer feedback throughout the firm, or informal and unstructured (Fundin & Elg, 2006).

Furthermore, the customer feedback processes employed by firms can be categorized in terms of (1) how the feedback has been gathered, as well as (2) what the format of the feedback is (Fundin & Elg, 2006). In terms of the former, feedback can be gathered in either an active or a passive manner (Sampson, 1999). Active feedback processes refer to feedback processes which actively solicit feedback from customers, thus aiming to increase the feedback intensity (Fundin & Elg, 2006). An example of active feedback processes is sending out customer surveys or having a pop-up window in an internet-based service, prompting the customer to answer questions related to their experience. Passive feedback processes, on the other hand, do not actively encourage customers to provide feedback and can be exemplified by a customer calling the customer service department. Thus, in this thesis, customer-initiated feedback falls into the category of passive feedback, whilst firm-initiated feedback is categorized as active feedback.

Second, the format of the feedback can be either codified, or personalized (Fundin & Elg, 2006). Codified customer feedback processes deal with transmitting feedback, i.e. information and data, in computerized systems. Personalized customer feedback processes deal with

information transmitted between people, e.g. service personnel which receive customer feedback and thus become knowledge carriers within the organization. This has traditionally, prior to the introduction of sensor and connected products and the therefrom resulting abundance of codified customer feedback, been the most dominant customer feedback system in firms (Wirtz, Tambyah, & Mattila, 2010). Thus, on the backdrop of the classification presented by Fundin and Elg (2006; 2010), four types of customer feedback *systems* emerge, which have the following principal characteristics:

1. Active and codified
2. Active and personalized
3. Passive and codified
4. Passive and personalized

Active and codified feedback systems consist of e.g. warning systems, automatically transmitted data during the use of a digital service, and designated tests of the same. The use of big data (Porter & Heppelmann, 2014), is therefore – based on the presented classification of Fundin and Elg (2006; 2010) – an active and codified feedback system. Examples of active and personalized feedback systems are consumer labs, where customers are invited to try out new products and services whilst providing feedback of their experience to the product development team at site. Active and personalized feedback systems have been identified as a critical activity in the early stages of new product development (van Kleef, van Trijp, & Luning, 2004), but an increasing number of service providers are also incorporating this practice, e.g. through so-called *living labs* (Leminen, Westerlund, & Nyström, 2014).

Passive and codified feedback systems contain e.g. the emerging phenomenon of social media feedback, i.e. when customers voice their opinion regarding firm's products or services on the firm's social media page, as well as traditional complaint systems through the firm's website. How firms can use social media feedback, e.g. in regards to their brand management, has received attention both from practitioners and researchers (Gensler, Völckner, Liu-Thompkins, & Wiertz, 2013). Finally, passive and personalized feedback systems entail the traditional customer service department, where customers can call in to voice their complaints or to ask questions. Here, personnel working within the customer service department often become knowledge carriers of customer information (Fundin & Elg, 2006). The four different types of customer feedback systems are illustrated in figure 1.

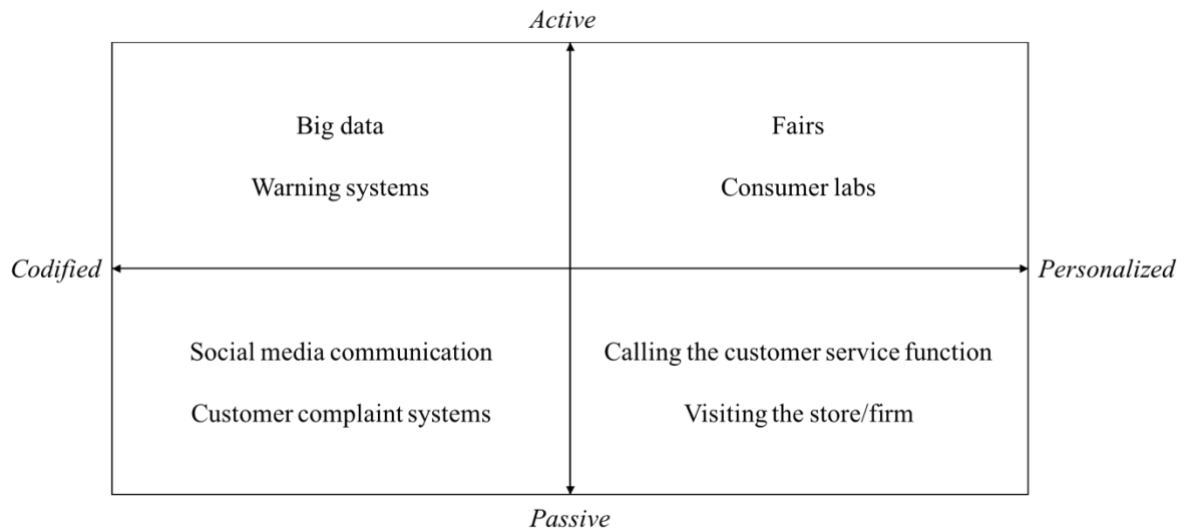


Figure 1: Four types of customer feedback systems, adapted from the feedback categorization by Fundin & Elg (2006)

2.1 Context: The transformative trends of servitization and digitalization

The context surrounding service delivery is transforming rapidly, with servitization and digitalization being two of the most influential trends shaping the service landscape (Ostrom et al., 2015). In this section, the contextual elements surrounding the research purpose will be discussed. First, research regarding servitization will be considered, before the emerging theoretical realm of digital services is explored.

2.1.1 Servitization

In order to grow revenue in markets with a high installed product base, meet the demands posed by competition from lower cost economies, and stay innovative, many manufacturing firms are today offering services, or integrated product-service solutions, in addition to, or instead of, their traditional product offerings (Lightfoot et al., 2013; Nordin & Kowalkowski, 2010; Oliva & Kallenberg, 2003). This change of business model is referred to as *servitization*, a term coined in 1988 by Vandermerwe and Rada to refer to the ongoing trend affecting manufacturing companies in a wide array of industries. Servitization has been described as “a business-model change and organizational transformation from selling goods to selling an integrated combination of goods and services” (Bustinza, Bigdeli, Baines, & Elliot, 2015, p. 53). Thus, servitization is viewed as a strategic choice, intended to ultimately increase the firm’s financial performance (Bustinza et al., 2015). Offering services changes the customer-firm relationship

from transactional to relational (Oliva & Kallenberg, 2003), which facilitates a stability in the customer relationship, thus creating barriers for competitors to sweep in, and providing a more secure revenue source for the firm (Bustinza et al., 2015). Furthermore, when manufacturing firms transition to also become service providers, it requires for example the development of a customer-oriented organization, and the development of processes which deal with service knowledge (Kinnunen & Turunen, 2012). It has been argued that “all firms offer service to varying degrees” (Mathieu, 2001, p. 39), affirming Levitt’s (1972) at-the-time radical proclamation regarding how “*everybody is in service*” (p. 41).

Research on the effect of servitization on firms’ financial performance has, however, produced mixed results (see e.g., Suarez, Cusumano, & Kahl, 2013, and Kohtamäki, Partanen, Parida & Wincent, 2013), and plenty of barriers have been identified for firms struggling to adopt a servitization strategy (Hou & Neely, 2013). These identified barriers are of both inter-organizational and intra-organizational nature, and include coordination difficulties with suppliers, and a lack of appropriate processes for dealing with customer information (Hou & Neely, 2013). Furthermore, the transition to offer services require the development of new capabilities, processes, and incentives (Oliva & Kallenberg, 2003), in order to develop an organization which has increased understanding of the firm’s customers and can deliver services which in turn will increase customer satisfaction (Bustinza et al., 2015). This requires a shift of managerial attention and focus away from the areas which have traditionally been deemed the most important within the manufacturing companies, such as e.g. new product development, to developing capabilities which can handle a relationship-based, rather than transaction-based, business model (Oliva & Kallenberg, 2003). In the face of these new requirements and barriers, some firms have embarked on a deservitization journey, retreating from some of their service business models (Kowalkowski, Gebauer, Kamp & Parry, 2017), and other have executed ‘partial servitization’ across certain organizational functions and customer offerings (Kinnunen & Turunen, 2012). In partial servitization, the firm chooses to not transform the whole organization to not transform the whole organization but focus on the departments and functions most suited to a shift toward being a solutions provider (Kinnunen & Turunen, 2012).

Amid the complex and multifaceted nature of different firms’ servitized offerings, an array of different service typologies has arisen within servitization research fields. In terms of the customer offering, servitization drives a change from value-in-exchange to value-in-use

(Vargo, Maglio & Akaka, 2008); one distinction of the service offering concerns whether it primarily supports (1) the functionality of the product, (2) the use of the product, or (3) the outcome of the product usage (Tukker, 2004). Similarly, a distinction is at times made between services supporting product (SSP), and services supporting the client (SSC) during the usage of the product (Mathieu, 2001). Instead of focusing on extending and facilitating the functionality of the physical product, SSC aim to facilitate the customer's processes. Thus, the two service types differ in terms of four dimensions: (1) the direct recipient of the service, (2) the intensity of the relationship between provider and customer, (3) the degree of service customization, and (4) the prevalent variables at play during the service process (Mathieu, 2001).

2.1.2 Digitally Connected Services - The intersection of servitization and digitalization

The setting in which services are delivered has changed significantly due to advances in technology, and information technology in particular – often referred to as *digitalization* (Ostrom et al., 2015). In the intersection of digitalization and servitization, a rapidly growing type of customer offering is emerging, namely ‘smart’ products which are connected to each other through built-in sensors, software or microchips (Porter & Heppelmann, 2014), and thus obtain the ability to deliver sophisticated ‘smart’ services (Wuenderlich, Heinonen, Ostrom, Patricio, Sousa, Voss, & Lemmink, 2015), which are services that are delivered from a smart product through a digital interface and involves connectivity, i.e. internet-based connection between the service, the service provider, and potentially also other smart products/services. One example of a such a service is a mobile application through which the customer can control and remotely access certain functions of the physical product. In this thesis, these types of digital services will be referred to as “digitally connected services” (DCS). There are several different concepts describing different digital services in literature, some of these are presented in table 1, but none that is unanimously agreed upon.

Table 1: Descriptions of digital services in literature

Author(s) (year)	Concept	Definition
Schumann et al. (2012)	- Technology-mediated services	“...services provided by a technological interface between provider and customer, which allows for an immediate exchange of information over long distances” (p. 133)
Rowley (2006)	- E-service	“E-service can be usefully conceptualised as an interactive information service” (p. 339) “...it is technology-mediated or facilitated” (p. 341)

	- E-service	“...the two inherent characteristics of e-service [...] e-service as <i>information service</i> , and e-service as <i>self service</i> ” (p. 341, emphasis added)
Meuter et al. (2000)	- Technology-based self-service	“...technological interfaces that enable customers to produce a service independent of direct service employee involvement” (p. 50)
Hiraoka (2009)	- Connected services	“...services [...] delivered by technologically-powered mechanisms” (p. 2)
Wuenderlich et al. (2015)	- Smart services	“Smart services are delivered to or via intelligent objects that feature awareness and connectivity” (p. 442) “...delivered to or, via an intelligent object, that is able to sense its own condition and its surroundings and thus allows for real-time data collection, continuous communication and interactive feedback” (p. 443)

DCS are one result of our increasingly digitalized society, where the boundaries between the social and the digital are becoming progressively blurred (Cecez-Kecmanovic et al., 2014). The social and the material are argued to be inseparately intertwined (Orlikowski & Scott, 2008), which impacts both the development and delivery of DCS (Cecez-Kecmanovic et al., 2014). Impacting the interface between organizations is the often novel constellation of actors which the provision of DCS relies on, resulting in both novel and complex relationships (Porter & Heppelmann, 2014). One example resides in the delivery of DCS through a smartphone application, where the firm needs to cooperate with the customer’s telecommunications carrier, one, or several, cloud storage provider(s), and the firm’s own connected systems. Adding to the complexity, in the delivery of DCS, consumer electronic firms, such as Google and Apple, can at times simultaneously be collaborators and competitors (Ahlemann & Bratzel, 2014). Furthermore, DCS differ from traditional services in a number of ways; for instance, they feature a digital interface between the firm and the customer instead of the traditional human–human interface (Rowley, 2006) and have the ability to remotely reach and serve customers relatively inexpensively (Porter & Heppelman, 2014). Moreover, the service delivery system is based upon automated processes performed by a digital infrastructure (Hiraoka, 2009). Manufacturing firms undergoing a servitization transition are increasingly relying on digitalization, in order to develop, and co-create the value of DCS together with the customers,

as well as to communicate with them (Lenka et al., 2017). Digitalization has opened up new communication channels with customers, where continuous interaction has become a possibility through the use of internet-based platforms (Ostrom et al., 2015). Thus, digitalization is of importance for the execution of many firms' servitization strategies (Coreynen et al, 2017).

The rapidly growing use of DCS is calling for new research to understand the effects these types of service offerings have on both organizations, and the interfaces between them (Schumann, Wunderlich, & Wangenheim, 2012). Whilst the servitization research field has gained substantial attention in several different research fields (Baines, Ziaee Bigdeli, Bustinza, Shi, Baldwin & Ridgway, 2017), research dealing with the inter- and intra-organizational implications of digitalization and servitization together, is still scarce (Coreynen et al., 2017; Lenka et al., 2017).

2.2 Working with customer feedback in the age of servitization and digitalization

As firms' offerings become increasingly complex and customer-centric due to servitization and digitalization (Coreynen et al., 2017; Lenka et al., 2017), there is a need to develop processes that can gather, analyze, and base decisions on information that captures customers' experiences of the firm's offering. This thesis considers that challenge from two perspectives: (1) customer-initiated feedback, and (2) firm-initiated feedback, which are displayed in figure 2. These two types of customer feedback will be explored in terms of their associated processes, capabilities, and organizational learning.

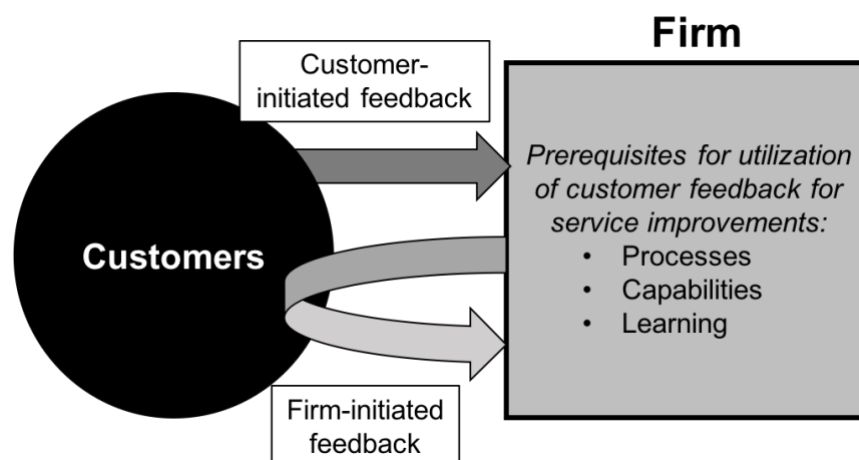


Figure 2: Customer-initiated and firm-initiated feedback as explored in this thesis

2.2.1 Customer-initiated feedback of digitally connected services

With digitalization impacting everything from internal processes to the actual customer offering (e.g., DCS), the ways in which customers interact with the provider firm are also changing (Ostrom et al., 2015). The amount of customer feedback, including information on how customers use the digital products and services, has increased tremendously with the introduction of digital services, such as cloud-based services, online retailing, use of smartphone applications, and social media (Storey & Song, 2017; McAfee, Brynjolfsson, Davenport, Patil, & Barton, 2012). Most of the customer feedback on digital services entails digital and codified information, often referred to as *big data*, coming from sensor signals, sale records, social media activities, and stem directly from the use of the service itself, e.g. which features the customers use, how long time they spend on each feature, and the number of customer using the service at a certain time, and is generated by the digital service itself, rather than prompted by the user of the service (Porter & Heppelmann, 2014; McAfee et al., 2012). Due to the vast amount of customer information, firms can now gain an unprecedented understanding of their customers and of their behaviors (Ostrom et al., 2015), thus enabling firms to base service improvements on the information collected by the DCS (Wuenderlich et al., 2015). As a result, both researchers and practitioners are increasingly interested in how this abundance of codified information and data can be used so that businesses can flourish (Porter & Heppelmann, 2014), and understanding how firms can use big data has been identified as one of the pivotal service research priorities (Ostrom et al., 2015). However, the abundance of data also results in an information overload, where firms often experience difficulties prioritizing which feedback information they should act upon (Ostrom et al., 2015). Furthermore, the provision of DCS, which are delivered through the internet, also open up a potential for two-way communication between the provider firm and the customer/user (Dellarocas, 2003), such as through the firm's social media or through a messaging system within the DCS itself.

Conclusively, the digitalization of services has opened up new feedback channels between customers and the provider firm, which deliver an abundance of customer feedback regarding the use of the service (i.e. big data) (Storey & Song, 2017), enabling firms to deepen their understanding of their customers (Ostrom et al., 2015). while traditional types of customer feedback on services (i.e., feedback delivered through a human–human interface) appear to have fallen of the research radar, or are now assumed to be unnecessary due to the advent of sensor data. Therefore, the research conducted in study 1 of this thesis explores how a

manufacturing firm affected by both servitization and digitalization handles the traditional, personalized customer feedback of its novel offering type, the DCS.

2.2.2 Firm-initiated feedback: Using customer satisfaction information as drivers for improvements

In addition to changing the customer offering, servitization and digitalization exert demands on firms' performance measurements (Nudurupati, Bititci, Kumar, & Chan, 2011). Traditionally, financial performance measurements (FPM) have dominated the performance measurement systems (PMS) of firms (Kaplan & Norton, 2004). However, today, most firms strive for a balance between FPM and non-financial performance measurements (NFPM) (Bititci et al., 2012; Nudurupati et al., 2011; Kaplan & Norton, 2004). The most commonly used NFPM is 'customer satisfaction' (Bititci et al., 2012; Kristensen & Westlund, 2003), which is often attributed to the notion that increased customer satisfaction results in increased financial performance (Eklof et al., 2017; Kristensen & Westlund, 2003; Fornell et al., 1996). Furthermore, customer satisfaction is argued to be a better predictor of future financial performance than the traditional financial performance measurements (Ittner & Larcker, 1998).

However, even though firms commonly employ customer satisfaction measurements (CSM), many firms are struggling with the use of CSM for quality improvements (Lervik Olsen et al., 2014) and few firms employ CSM in their market analysis, relying instead on e.g. market size and share (Stern, 2006). In general, use of customer information is argued to be immature in many firms (Rollins, Bellenger & Johnston, 2012), which is reasoned to be linked to the notion that information regarding the firm's customers is the most complex information handled by the firm (Davenport, Harris & Kohli, 2001).

Though research on customer information usage (CIU) is scarce, three different types of CIU have been identified in a business-to-business context: (1) symbolic, (2) action-oriented, and (3) knowledge-enhancing (Rollins et al., 2012). Symbolic CIU is a type of usage where customer information is used solely for appearance sake, thus not being utilized as input in the firm's decision-making process. Second, action-oriented usage refers to the direct application of customer information, meaning that the CIU results in some kind of action. This type of CIU is characteristic for customer-service departments, where employees often respond immediately to the customer information they receive. Finally, knowledge-enhancing usage is a strategic and indirect use of customer information, where the firm enriches its aggregated knowledge

about its customers rather than deal with a specific customer issue or relationship. Action-oriented CIU has been cited as the most common type of CIU (Morgan et al., 2005), while other studies have found symbolic usage to be the most prevalent kind (Vyas & Souchon, 2003).

2.2.2.1 The process of using customer satisfaction information

One specific subset of customer information usage is customer satisfaction information usage (CSIU), which has been defined as "...the processes that a firm uses to monitor, diagnose, and take action to optimize CS" (Morgan et al., 2005, p. 132). Although research is increasingly elaborating on the linkage between a firm's financial performance and its level of customer satisfaction (Eklof et al., 2017; Kristensen & Westlund, 2003; Fornell et al., 1996), research regarding the processes constituting the CSIU is still scarce (Lervik Olsen et al., 2014; Morgan et al., 2005). Morgan et al. (2005) identified a four-phase CSIU-process, which was further developed by Lervik Olsen et al. (2014) into a three-phase process.

Investigating the CSIU process of 320 service firms, Lervik Olsen et al. (2014) tested Morgan et al.'s (2005) CSIU-process, and identified a usage process consisting of three interrelated phases instead of four: *strategy*, *measurement*, and *analysis and implementation*. These phases are argued to have a direct relation to customer satisfaction (Lervik Olsen et al., 2014), which in turn is related to the firm's financial performance (Eklof et al., 2017). Examining the CSIU-phases closer, the first phase, the strategy phase, focuses on preparing the organization for the usage of CSI. Activities within this phase include formulating a CSIU-strategy, including planning how, when, and by whom, the CSI should be utilized within the organization. The strategy phase also involves the development, or sourcing, of CSI-measurement tools for collecting the CSI. Other activities include relating CSI to other performance measurements used within the firm. The strategy phase thus aims to prepare the organization to use CSI in the firm's decision making.

Activities in the second phase revolve around translating the CSI into information which is perceived as relevant, timely, and actionable by the employees (Morgan et al., 2005). To accomplish this, explanations to changes in the CS-scores should be elaborated on, correct measures for the measurements constituting CSI should be affirmed and well defined (Lervik Olsen et al., 2014). Furthermore, the measurement phase should entail activities which elaborate on the link between the CSI and other measurements within the firm (Morgan et al., 2005).

In the third phase, analysis and implementation, the focus lies on making the CSI accessible throughout the organization (Lervik Olsen et al., 2014). If firms aim to utilize CSI as input in their decision making, as well as their strategic planning, a cross-functional, organization-wide, use of CSI is central (Morgan et al., 2005). Thus, communicating the CSI in a manner that is available to all employees, e.g. through an organization wide intra-net, facilitates the partaking of employees in activities which have sprung from the CSI-analysis and aim to improve the firm's CS (Lervik Olsen et al., 2014).

2.2.3 Organizational capabilities in play when utilizing customer feedback

An understanding of the firm's internal workings is important for comprehending how it can link customer feedback to sustained service improvements, thus using customer feedback as input in the decision-making. In this thesis, firms will be analyzed through the lens of the firms' *capabilities*, a theoretical view which is argued to originate from the resource-based view (RBV) of the firm (Wernerfelt, 1984; Barney, 1991). An introduction to RBV will be followed by exploring the concept of a firm's dynamic capabilities (see e.g. Teece, Pisano, & Shuen 1997; Teece, 2007) as well as capabilities of market-driven organizations (e.g. Day, 1994) in order to understand how firms can manage capabilities dealing with customer feedback. Conclusively, an outline of how firms learn and create knowledge (see e.g. Nonaka, 1994), e.g. knowledge regarding their customers and the feedback they provide, is presented.

2.2.3.1 *The origins: Resource-based view*

The resource-based view (RBV) of the firm is built upon the notion that "firms obtain sustained competitive advantages by implementing strategies that exploit their internal strengths, through responding to environmental opportunities, while neutralizing external threats and avoiding internal weakness" (Barney, 1991, p. 99). Thus, firms' competitive success depends to a large degree upon the firm's capabilities and resources, which are heterogeneously spread across competing firms (Wang & Ahmed, 2007). Consequently, firms have different sets of capabilities and resources, which also are not easily replicated or transferred, allowing firms to sustain their heterogeneity over time. These types of unique resources are often argued to be *valuable*, *rare*, *inimitable*, and *non-substitutable* (VRIN) (Lin & Wu, 2014; Teece, 2014; Eisenhardt & Martin, 2000). The way firms use of their resources, is referred to as the firm's *capabilities* (Wang & Ahmed, 2007). Capabilities have been defined as "complex bundles of skills and collective learning, exercised through organizational processes, that ensure superior coordination of functional activities" (Day, 1994, p. 38).

2.2.3.2 *Dynamic capabilities*

In contrast to ordinary, operational, capabilities, the concept of dynamic capabilities (DC) refers to the ability to respond to external change (Winter, 2003), by altering the existing resource base, i.e. by building, integrating and reconfiguring internal and external competencies in order to respond to changes in the external environment (Teece, Pisano, & Shuen, 1997; Lin & Wu, 2014; Wang & Ahmed, 2007). The concept of DC emerged from the notion that RBV failed to satisfactorily explain why some firms succeeded better than others in times of volatile and rapidly changing external environments (Eisenhardt & Martin, 2000), thus complementing RBV's more static approach to a firm's capabilities and resources with a dynamic one (Ambrosini, Bowman, & Collier, 2009) by "encapsulating the evolutionary nature of resources and capabilities" (Wang & Ahmed, 2007, p. 32). Ordinary capabilities deal with the administrative, operational, and governance-related functions serving as prerequisites for its processes and activities (Teece, 2014). DC on the other hand constitute a higher-level routine(s) (Winter, 2003), and deal with higher-level activities (Teece, 2014). Furthermore, DC entail complex, organized patterns stemming from the organization's accumulated skills and knowledge, which over time establish themselves as organizational routines (Morgan, Vorhies, & Mason, 2009). DC entail three key activities: *sensing* the changes and opportunities in the external environment, *seizing* the identified opportunities, and *transforming* the firm's ordinary capabilities in order to better respond to the identified changes and opportunities (Teece, 2014). The building blocks of these three key activities are so called microfoundations, which have been defined by Teece (2007) as "distinct skills, processes, procedures, organizational structures, decision rules, and disciplines" (p. 1319). In the age of rapid market changes impacting firms, e.g. digitalization and servitization, the link between a firm's success amongst its competitors and the firm's set of DC has become profound (Coreynen et al., 2017; Saul & Gebauer, 2018).

Manufacturing firms aiming to adopt a servitization strategy by also providing services and/or integrated solutions need the capabilities that would allow them to become more customer-centric (Saul & Gebauer, 2018). Furthermore, Saul and Gebauer (2018) stress that such firms need the capabilities that would allow them to handle the complexity of dealing with products and services simultaneously, while ensuring that they retain their product expertise. Having a structured approach to organizational learning, being able to sense customer requirements, and providing extensive customer support, are all mentioned as some of the vital capabilities for

firms in the servitization realm (Saul & Gebauer, 2018). With digitalization, and digital services, becoming part of the firm's processes and offerings, the ability to comprehend digital data is also highlighted as an important capability (Coreynen et al., 2017).

2.2.3.3 *Market-oriented capabilities*

The concept of market-oriented capabilities, often referred to as *marketing capabilities* (Morgan, Vorhies, & Mason, 2009), may be useful in bridging the more general and overarching nature of DC with the concrete resources and capabilities at play in the interface between the firm and its customers (Day, 1994). Firms which possess market-oriented capabilities are argued to achieve their success due to being well-informed of their customers wants and need, both active and latent, as well as possessing information regarding their competitors and external environment (Morgan et al., 2009). Thus, fundamental characteristics of market-oriented firms is their ability to continuously gather information regarding their customers and their external environment in a systematic, thoughtful, and anticipatory manner (Day, 1994). Concrete market-oriented capabilities have been identified as *market sensing*, *customer linking*, and *channel bonding*, which are argued to be the foundation of market-driven organizations (Day, 1994), and are closely related to the concept of *customer-oriented organizations* (Rodriguez, Peterson, & Ajjan, 2015). *Market sensing* deals with the firms' ability to sense changes in its external environment, i.e. to learn about its customers and competitors. *Customer linking* refers to developing and maintaining close customer relationships, whilst *channel bonding* deals with developing supply network relationships. Furthermore, Day (1994) argues that capabilities are closely intertwined with an organization's processes, since the capabilities are the facilitators of the activities carried out within a process. Possessing customer-oriented processes entails "understanding customers, adapting to customers changing needs, measuring customer satisfaction, and aligning customer needs with sales and marketing activities" (Rodriguez, Peterson, & Ajjan, 2015, p. 93). These processes, however, need to be complemented with customer orientated behavior in order for them to affect the firm's bottom line, according to Rodriguez et al. (2015). Therefore, when aiming to understand how customer feedback is used, in order to establish prerequisites for service improvements, an understanding of both the necessary capabilities and processes is needed.

2.2.4 Organizational learning

Since capabilities have been identified as partly being a result of organizational learning, a vital component of capabilities is related to knowledge (Zollo & Winter, 2002; Baker & Sinkula, 1999), which is often both tacit and scattered within the organization (Day, 1994). Organizational knowledge creation is “the process of making available and amplifying knowledge created by individuals as well as crystallizing and connecting it to an organization’s knowledge system” (Nonaka & von Krogh, 2009, p. 635). A widely recognized model of how organizations learn and create knowledge was presented by Nonaka (1994), portraying how firms develop knowledge through constant interchange between tacit and explicit knowledge. The former, tacit knowledge, refers to personal knowledge which is difficult to formalize and communicate, whilst the latter refers to codified knowledge which is easily transmitted through formalized systems (Nonaka, Takeuchi, & Umemoto, 1996). The constant interchange between tacit and explicit knowledge is referred to as *knowledge conversion*, representing the dynamic nature of organizational knowledge creation (Nonaka et al., 1996). The four types of knowledge conversions, often referred to as knowledge conversion *modes*, are depicted in figure 3:

1. Socialization, from tacit to tacit knowledge conversion
2. Externalization, from tacit to explicit knowledge conversion
3. Combination, from explicit to explicit knowledge conversion
4. Internalization, from explicit to tacit knowledge conversion

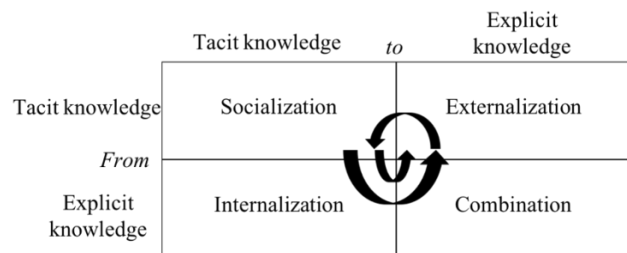


Figure 3: Knowledge conversion modes, as identified by Nonaka, Takeuchi, & Umemoto, 1996

It is proposed that organizational knowledge is the facilitation, accumulation, crystallization, and storing, of individual employees’ knowledge (Nonaka et al., 1996). The skills needed to conduct activities within sense, seize, and transform, as well as the transition between these, do not emerge automatically – rather these skills are developed from higher-order capabilities, meaning e.g. the firm’s capability to learn and use the generated knowledge (Saul & Gebauer, 2018). However, learning from external market information, such as customer feedback, is not sufficient for many firms (Saul & Gebauer, 2018). In addition to sensing external opportunities, an inward assessment of the firm’s own competencies and skills are needed, in order to

understand how the firms can mobilize and transform its resources to meet the external demands (Saul & Gebauer, 2018).

2.3 Theoretical synthesis

The purpose of this thesis is to explore the use of customer feedback in order to identify prerequisites needed to use customer feedback for service improvements, which is addressed by exploring the use of both customer-initiated and firm-initiated customer feedback.

Starting with customer-initiated feedback, the focus of this thesis has been on personalized DCS feedback. In contrast to the surge of interest in the new type of feedback stemming from the array of digital services on the market (Storey & Song, 2017; Porter & Heppelmann, 2014; McAfee et al., 2012), i.e. codified and automated feedback, often referred to as *big data*, personalized customer feedback regarding DCS has not received as much attention. However, the distinct characteristics of DCS, having emphasis on both service aspects as well as digital aspects, create a novel type of service, which calls for explorative studies aimed for understanding the new phenomenon and the impact it has on its associated processes. Furthermore, in terms of using firm-initiated customer feedback, which in this thesis regards the use of CSI, a three-phase process has been identified (Lervik Olsen et al., 2014). The three phases are *strategy*, *measurement*, and *analysis and implementation*. Furthermore, three different types of CSIU has been found: *symbolic*, *action-oriented*, and *knowledge-enhancing* (Morgan et al., 2005).

In order to respond to external changes, e.g. customer feedback, firms need to possess dynamic capabilities (DC) which can alter the existing resource base of the firm (Winter, 2003; Teece et al., 1997). Additionally, the firm's ordinary capabilities, which are more static in comparison to the firm's DC, serve as prerequisites for the firm's administrative and operational processes (Teece, 2014). Linking the overarching DC with concrete resources in the firm-customer interface are market-oriented capabilities (Morgan et al., 2009; Day, 1994). Firms which successfully employ market-oriented capabilities are well-informed about their customers and external environment (Morgan et al., 2009), which is achieved by continuously gathering and systematically using information regarding their customers and competitors (Day, 1994).

A firm's capabilities are developed from and shaped by the accumulated knowledge within the firm (Zollo & Winter, 2002). Creating organizational knowledge requires processes which access and amplify individual employees' knowledge to the firm's knowledge system (Nonaka & von Krogh, 2009). Furthermore, knowledge is created in the continuous interplay between the firm's tacit and explicit knowledge, through four knowledge conversion modes: *socialization*, *externalization*, *combination*, and *internalization* (Nonaka et al., 1996). An illustration of a firm's customer feedback processes, capabilities, and organizational learning is depicted in figure 4.

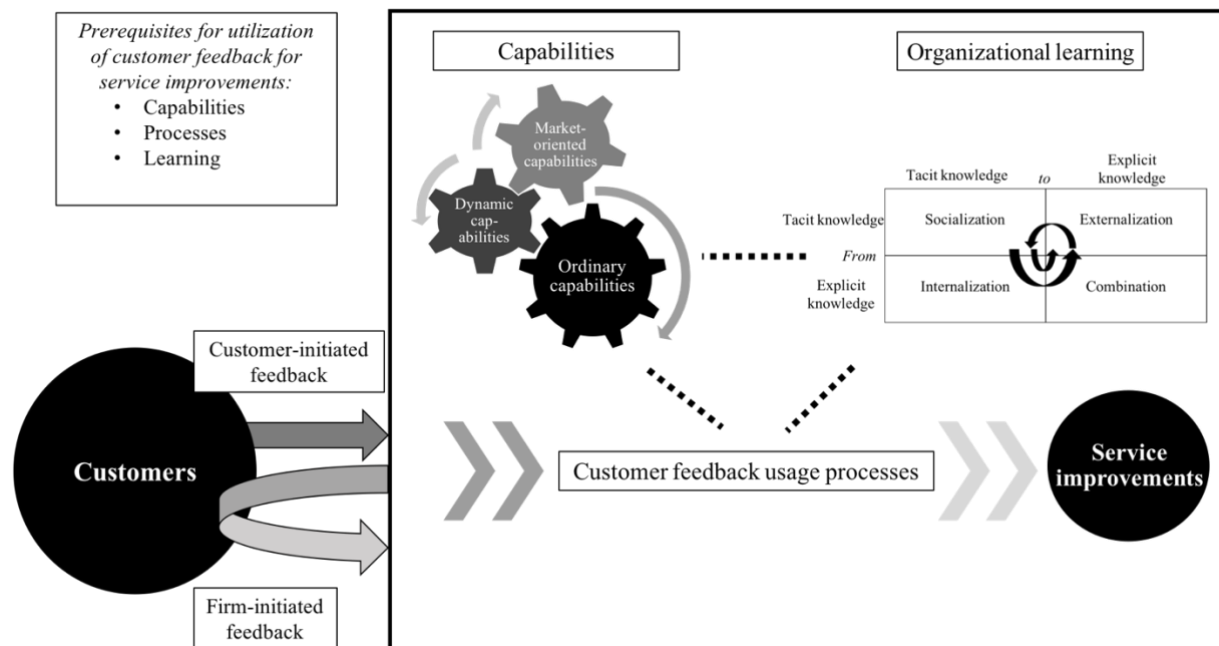


Figure 4: Customer feedback, customer feedback usage processes, capabilities, organizational learning, and service improvements

3 Research methodology

This study's research methodology shares many characteristics with its field of inquiry; it is explorative and dynamic, and emphasizes learning and understanding. This chapter will present the study's research design, purpose, research questions, and empirical context, as well as its research process and methods, while elaborating on the rationale of the choices made.

3.1 Research design

To ensure suitability, the research design should be guided by the purpose of the research, and operationalized through the research questions (Maxwell, 2012). The dynamic, and currently evolving, phenomenon of exploring the prerequisites for basing service improvements on customer feedback in the context of servitization and digitalization, is far from well defined, and has not been exhaustively studied by any particular research field. Rather, the issues connected to the particular phenomenon reside in several different research fields, as well as in the interfaces between these, which in turn calls for the collection of rich, empirical data in order to be able to further the understanding and knowledge of the phenomenon (Edmondson & McManus, 2007). It can therefore be argued that the research is phenomenon-driven, rather than driven by a gap in existing literature (Schwarz & Stensaker, 2014). This does, however, not mean that there is no gap in existing literature, since the phenomenon lacks a well-developed theoretical foundation. It could therefore be argued that the phenomenon has nascent theoretical underpinnings, thus further implying a suitability for qualitative research strategy (Schwarz & Stensaker, 2014; Edmondson & McManus, 2007). This is illustrated by the purpose and the research questions of the research, which concern the understanding of the evolving phenomenon rather than establishing structures between existing theoretical constructs. Furthermore, since the research questions are open-ended inquiries regarding the phenomenon of interest, the collection of qualitative data is argued to be the most suitable (Edmondson & McManus, 2007; Flick, 2014).

Furthermore, since the purpose of the research concerns exploring organizational prerequisites, an understanding of employees' perceptions and experiences regarding these matters is of the essence. Since these sources of information, meaning employees' perceptions and experiences, are subjective, a research design which has the capability of capturing these subjective and often non-quantifiable viewpoints is called for. Thus, qualitative case studies were deemed the most suitable, since this allows the research to capture nuances, subjective opinions, as well as facilitates an in-depth understanding of the phenomenon at hand (Flick, 2014).

3.2 Research purpose, research questions, and their relation to the studies

The research is guided by the research purpose and operationalized through the two research questions. Since the setting of the research is evolving, the research is phenomenon-driven and aims to contribute with knowledge regarding the phenomenon itself and the research field(s) surrounding the phenomenon, rather than contributing to a specific theory's extension (Schwarz & Stensaker, 2014). Thus, the purpose is of *exploratory* nature, aiming to increase the knowledge regarding how customer feedback can be used as basis for service improvements.

The purpose of this thesis is to explore the use of customer feedback, in order to identify the prerequisites needed to use customer feedback for service improvements. The purpose is addressed by exploring the usage of customer-initiated and firm-initiated customer feedback.

The relationships between the purpose of the research, the research questions, the conducted studies, and the resulting papers, are presented in figure 5.

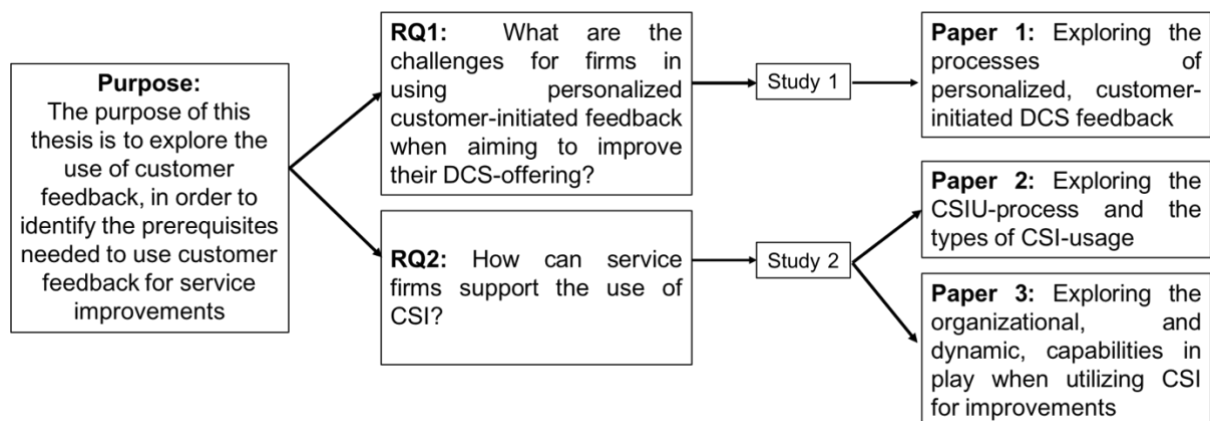


Figure 5: Relationship between the research purpose, research questions, studies, and papers

This research lies in the intersection of several research streams, most notably operations management (OM), industrial marketing (IM), service management (SM), and quality management (QM). In these research streams, qualitative research methods and case studies have gained increasing interest (e.g. see Barratt, Choi, & Li, 2011; Beverland & Lindgreen, 2010). Furthermore, research revolving around servitization is predominantly surging from five research communities: services marketing, service management, operations management, product-service systems, and service sciences (Lightfoot et al., 2013). However, due to diverse origin of knowledge contributions regarding servitization, a call for “awareness and cohesion

across these communities [...] will help to improve the quality and rate of knowledge production and establish important future research challenges” (Lightfoot et al., 2013, p. 1409). Thus, the research draws insights from several of the above-mentioned research fields, in an effort to further the understanding of the firms customer feedback usage in the empirical context of servitization and digitalization.

3.3 Research process and methods

Below, the two conducted studies, and the employed sampling-, data collection-, and data analysis-procedures, as well as the chosen methods within the studies, will be presented.

3.3.1 Study 1

Study 1 is based on a case study set in a global firm’s headquarters in Sweden, a firm which resides in a mature manufacturing industry characterized by complex technical products predominantly developed for a B2C-market. The industry is currently highly impacted by both digitalization and servitization, and it is predicted that firms within this industry in the future mainly will compete based on their digitally connected services (which in this thesis are referred to as DCS). The case sampling and selection was guided by the explorative nature of the research, which initially had the broad aim of understanding how DCS alter requirements on existing processes and competences within established manufacturing firms. Selecting the case firm, a well-established and large manufacturing firm which is moving into the DCS-market therefore made sense, since the case would allow for the collection of rich empirical data regarding the phenomenon, which is in line with Eisenhardt and Graebner’s (2007) reasoning around case sampling. Thus, the case setting allowed for exploration of the impact servitization and digitalization has on an established, and successful, industry actor. The data collection in study 1 consisted of four primary building blocks: (1) focus groups, both used initially for exploratory purposes, and to develop the study’s precise research focus and purpose, and used for analysis validation and data complementing during the later phases of the study, (2) shadowing of identified key employee, (3) in-depth interviews with two key employees, the DCS quality manager and the customer service director, and (4) complementing interviews with employees residing in several different functions related to the DCS development and improvement processes.

The initial general aim of study 1 was to explore the how the provision of DCS impacted the existing processes and competences within the case firm. Due to the explorative nature of the

research, the study started with an open, cross-functional focus group, consisting of several senior managers within the firm. Utilizing focus group in the initial stages of a study can be beneficial, due to the broad perspective on the study matter that can be gained from the cross-functional setting and broad, open-ended discussion questions (Flick, 2014). The purpose of the meeting was to gain insights from different functions of the firm regarding the issues and challenges that the firm was facing as the firm had started to deliver DCS. One significant challenge which the firm experienced was the lack of knowledge regarding how customer feedback could be used as basis for DCS improvements. The case firm therefore offered the possibilities of researching the organizational prerequisites, and challenges, associated with basing service improvements on customer feedback.

After the initial meeting, shadowing, focus groups, and semi-structured interviews were employed in order to gain an understanding regarding how the firm was working with customer-initiated feedback in relation to DCS improvements. The data collection was focused on various roles within the corporate quality function and the customer service function, due to their separate, but significant, involvement in the service improvement processes. An outline of the interviewees is presented in table 2.

The quality function is the function within the firm which, both traditionally and currently, identifies and carries out improvements of the firm's offerings. However, as the firm had started to offer services in general, and DCS in particular, the customer service department had become the primary recipient for customer feedback regarding DCS. It was therefore deemed valuable to explore how the firm was utilizing this customer-initiated feedback from both the angle of the quality function, as well as the customer service function. The primary interviewees were the DCS quality manager and the customer service director, which were interviewed multiple times over a time period of 1.5 years. The interviews were semi-structured, face-to-face, and were, after permission was received from the interviewees, recorded and transcribed. The interview questions were open-ended, to allow the interviewees to provide content-rich answers (Bryman & Bell, 2015). The semi-structured nature of the interviews allowed for the possibility of adjusting the questions for the occasion and capturing the interviewee's perceptions and experiences (Rowley, 2012).

Table 2: Interviews conducted in study 1

No.	Interview position	Length of interview (hh:min)
1	DCS Quality Manager	01:32
2	Customer Service Director	00:38
3	Customer Service Director	00:40
4	Senior Director Quality	01:05
5	Quality Audit Manager	01:28
6	Business Development Director R&D	00:55
7	Senior IT Director	00:48
8	Internal Audits and Assessments Expert	01:18
9	Senior Manager Quality Methods	00:49
10	Senior Advisor Quality	01:32
11	VP Corporate Quality	01:01

In regards to the data gathered with the aid of the DCS quality manager, the interview guides for the semi-structured interviews were initially solely informed by literature on DCS and customer-feedback, but evolved during the process to also include questions which arose from the iterative interplay between the collected data and theory. One example of an area where new questions arose concerns how the feedback information for DCS and products respectively, was converted into knowledge, as guided by the framework developed by Nonaka (1994). Furthermore, shadowing was employed to gain deeper insights into the firm's customer feedback and DCS improvement processes. During the shadowing episodes, the DCS quality manager was shadowed during her workday. Shadowing has been found useful in the context of studying leaders in high-technology firms (McDonald, 2005), and time periods of observations, e.g. during meetings, were complemented with times where the DCS quality manager was prompted to explain what, and why, was happening. Insights were gained during cross-functional meetings and solo-episodes, and notes were taken continuously both during and after the shadowing episodes. A benefit of shadowing is that the gathered data is not solely provided from one employee's viewpoint of the situation, but can potentially be complemented with information which is difficult to communicate or differs from the shadowed subject's experience (Czarniawska-Joerges, 2007; McDonald, 2005).

The second part of the data collection, entailed semi-structured interviews with the customer service director, as well as a focus group consisting of employees from the customer-facing customer service function, as well as employees from the centralized quality function. During the semi-structured interviews with the customer service director, the focus was on understanding the customer feedback processes of the firm, both in terms of DCS feedback and in terms of the traditional product feedback. The focus group allowed for cross-functional discussion of the findings thus far, clarifying the information as well as complementing the information from a broad, cross-functional perspective. Furthermore, the focus groups aided in the validation of the initial analysis (Flick, 2014), as a synthesis of the findings matched with existing theory was presented during the focus group, to allow for review and comments from the employees regarding the analysis. The involvement of cross-functional focus groups was deemed important, since several different functions were involved with different aspects of the DCS development, delivery, and improvement processes.

The data analysis was conducted iteratively, with a continuous interplay between literature study, data collection, and analysis, thus the research utilizes a *systematic combining* approach (Dubois & Gadde, 2002). Furthermore, the data analysis was conducted in the NVivo11 software, a software which is suitable when dealing with the complexities of analyzing rich qualitative data (Richards, 1999), which was the case in study 1, since the collected data consisted of interview transcriptions as well as field notes from shadowing and observations. The data analysis process followed a thematic analysis approach (Braun & Clark, 2006), a method which aided in identifying patterns, or *themes*, in the collected data. Themes represent an important concept, or pattern, in relation to the study's research question and purpose, without trying to force the data into a predefined coding framework (Braun & Clark, 2006). Examples of themes that were identified during the data analysis process were *personalized feedback channels*, *DCS knowledge*, and *challenges of working with DCS feedback*. The identified themes emerged iteratively in the analysis phase, starting when the author and one co-author of paper 1 individually read some of the first interview transcripts and field notes, and continued to evolve as the iterative process of data collection, literature study, and data analysis progressed.

3.3.2 Study 2

The aim of study 2 was to move from the customer-firm interface, and the processes related to customer-initiated feedback, into the firm itself and the processes and capabilities related to

firm-initiated customer feedback. The purpose of study 2 was to explore how, in terms of organizational capabilities and usage processes, customer satisfaction information can be used as driver for the firms' service improvements. To fulfil the purpose, data were collected from 27 service firms present in a variety of Swedish service sectors, such as e.g. banking, staffing, and ICT. Focusing the sample on service firms, was based on the notion that service firms are more likely to employ a customer-oriented strategy (Wang, Zhao, & Voss, 2016), which therefore arguably implies a more mature, and further developed, approach to the usage of customer satisfaction information. The variety of service sectors represented in the sample were a result of a purposive sample strategy (Flick, 2014), as it gave the possibility to gather insights regarding commonalities and differences between different service industries.

Furthermore, the sampling was conducted in a manner which enabled data collection from firms which were scoring high, mediocre, and low, on the EPSI customer satisfaction index (EPSI Rating Editorial Board, 2011), a leading European market intelligence provider. This facilitated the initially set aim of exploring if firms were using customer satisfaction information differently depending on if they scored high, medium, or low on the EPSI customer satisfaction index. The data collection consisted of semi-structured interviews with employees from 27 service firms, active in a variety of service industries in Sweden. A total of 37 semi-structured interviews were conducted, ranging between 40 to 90 minutes. The interviews are depicted in table 3. The interviewees were selected by the firms themselves, and held senior management positions related to the use of customer satisfaction information. All interviews were conducted face-to-face at the employee site, and were, after having received permission, recorded and subsequently transcribed. The interviews followed an interview guide which was focused on open-ended questions regarding the usage processes of customer satisfaction information within the firm.

Table 3: Interviews conducted in study 2

Industry	Position of interviewee
Banking	Customer Insights Manager
Banking	CEO
Banking	Senior VP and Sustainability Manager
	HR Manager, Employee Branding
	Branch Manager
Banking	Customer Insight Manager
Banking	Management Partner
Banking	HR Manager, Employer Branding

	Employee Working Environment Manager
	Branch Manager
Energy	Customer Service Manager
Energy	Net Promoter Score Manager
Energy	CEO for a subsidiary in an energy company group
Energy	CEO
Energy	Marketing and Sales Manager
Energy	Business Area Manager
Energy	Business Area Manager
Energy	Quality and Sustainability Manager
Energy	CEO
	Customer Process Manager
Health & Fitness	Communications Manager
ICT	Communications Manager
	Director of Customer Experience
	NPS Manager
ICT	Customer Relationship Manager
ICT	Senior Business Analyst Manager
ICT	Customer Relationship Manager
	HR Business Partner
	HR Director
ICT	Customer Relationship Manager
	Strategy Manager
	Quality Manager
Insurance	Insurance Manager
Public Agency	Area Manager
	Key Account Manager
Public Agency	Marketing Manager
Staffing Industry	Quality Manager
Staffing Industry	Business Process Development Manager
Transportation	HR Manager
	Customer Insights Measurements Manager

For both papers, the data analysis was conducted in an iterative manner, utilizing a systematic combining approach (Dubois & Gadde, 2002) by iteratively conducting a literature study, collecting data, and performing analysis. The data analysis was conducted in the NVivo11 software, which facilitated the coding of the collected data (Richards, 1999). For paper 2, the coding process in NVivo was initially informed by the phases of the CSIU-process, as identified by Lervik Olsen et al. (2014), as well as the three different types of CSI-usage, as identified by Rollins et al. (2012). As the data collection progressed, more themes emerged from the data, such as e.g. specific activities within the phases. For paper 3, the data analysis was conducted in three steps: (1) first, the interview transcripts were coded with the aim of identifying prerequisites for the firms CSIU-process. This coding progressed iteratively whilst a literature study focusing on capabilities was conducted. (2) Secondly, the data was analyzed with the aid

of a thematic analysis, where patterns emerging from the data which were connected to the purpose of the paper was coded, whilst simultaneously aiming to avoid forcing the data into an unyielding, predefined coding framework (Braun & Clark, 2006). Since the purpose of the paper revolved around exploring the DC related to CSIU, the patterns which emerged in the data were connected to activities and capabilities related to the three DC phases of sensing, seizing, and transforming (Teece et al., 1997). (3) Third, the themes, patterns, and coding nodes, which had emerged from the first two phases, were analyzed in further detail, whilst iteratively consulting the extant literature within the concerned area.

3.3.3 Research timeline

Below, a rough draft of the research timeline is illustrated in figure 3. The literature study has been an ongoing process, which has served both as input and as a sounding board for the conducted studies and analysis. In the figure, the timeline for the papers which are included in this thesis are illustrated. However, it should be noted that all three papers have originated from conference papers, which have been written and presented before the work of the current versions started.

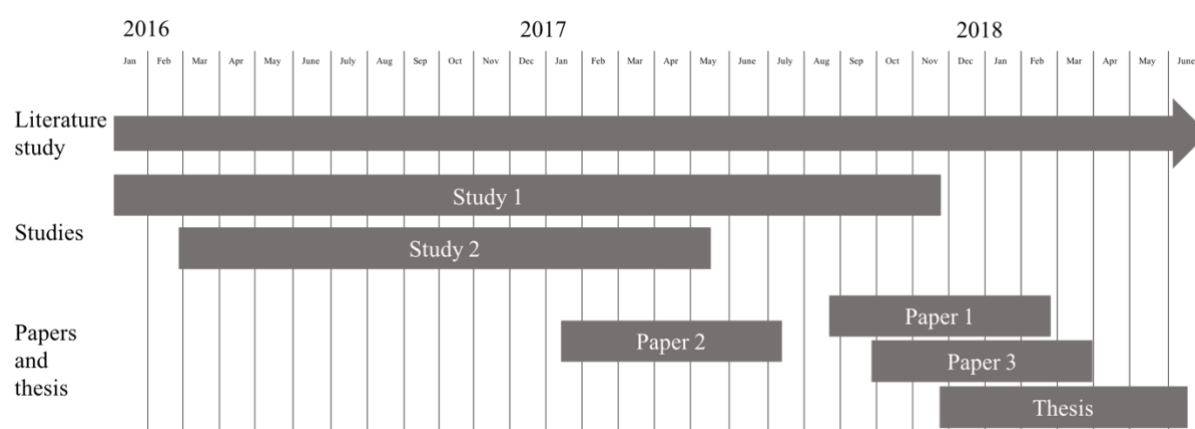


Figure 6: Research timeline

3.4 Research quality

In terms of methodological limitations, there are always benefits and drawbacks of the methodological choices made. Here, a brief discussion regarding the chosen research methods will be provided. Furthermore, the research will be gauged in relation to research quality criteria. Conclusively, ethical considerations connected to the research will be discussed.

3.4.1 Methodological limitations

Qualitative studies are deemed most suitable for exploratory research questions and purposes (Flick, 2014; Edmondson & McManus, 2007). However, in terms of study 1, a single case firm has been chosen as the setting of the study. Conducting the study solely in one firm, has been argued to lead to lack of generalizability of the findings, and thus the inability for theory development to occur as a result of the conducted single case study (Eisenhardt, 1989). This notion, however, has been argued against by e.g. Flyvbjerg (2006), and Dubois and Gadde (2002), emphasizing the depth and importance of content-dependent theory, which can arise from single case studies.

The strengths and weaknesses of study 1 are inverted in study 2; where study 1 potentially lacks generalizability, study 2 risks lacking depth. Study 2 is based on a fairly large number of firms, which potentially enables a generalization across service industries, but the data collection has focused on a few interviewees per individual firm. However, since the phenomenon of the research is dynamic, complex, and lacking strong theoretical underpinning, both studies have the potential to add to the theory development of the phenomenon. Study 1 provides context-specific insights into the challenges of utilizing personalized customer feedback regarding an offering which due to its nature provides an abundance of codified feedback. Through focus groups, in-depth interviews with the managers of two key functions in regards to the DCS, and complementing cross-functional interviews with managers who in some way are connected to the DCS improvement processes, rich data regarding the matter has been gathered. Study 2, on the other hand, provides a more general overview of the state-of-context in regards to the use of customer satisfaction information across several service industries in Sweden.

3.4.2 Research quality

There are several different ways of assessing the quality of conducted research. For the purpose of this research, Bryman and Bell's (2015) concept of *trustworthiness* was chosen. Trustworthiness is built upon four criteria: credibility, transferability, dependability, and conformability.

Regarding the research's *credibility*, the aspect of how the research deals with the notion that there is no objective reality – thus, the data collected from the interviewees portrays their subjective view of the world – has to be examined (Halldórsson & Aastrup, 2003). One way of increasing credibility and dealing with the inherent subjectivity of a human's account of events,

is the triangulation of different data sources, data collection methods, and the use of several researchers when collecting and analyzing the data (Bryman & Bell, 2015). Triangulation has been used in both studies, both in terms of the employed data sources in the conducted research, e.g. interviews, focus groups, and shadowing, as well as the continuous interplay between two or more researchers when analyzing the collected data. One example of data analysis triangulation which has been employed when writing the papers, is that the author would ask one, or two, of the paper's co-authors, to review the collected data, and identify patterns or themes which naturally emerged from the data or were related to the purpose of the papers. The analysis was then matched with the analysis conducted by the author, to identify any discrepancies and new insights.

The *transferability* of the research, concerns whether or not the findings of the research are generalizable to some extent. The challenge of potential generalizability has been discussed to some extent in section 3.4.1. *Methodological limitations*. Generalizability is a difficult subject, since it is highly dependent on the research's *unit of analysis*. In this research, the unit of analysis has been *the use of customer feedback*, which includes the processes and capabilities in play when utilizing customer feedback in the shape of CSI, or personalized DCS-feedback. In order to facilitate transferability, it is beneficial to provide rich empirical material (Bryman & Bell, 2015). In terms of the conducted research presented in this thesis, the papers offer rich empirical insights and quotes, upon which the readers can follow the analysis provided and decide on the transferability to other research contexts. For study 1, the transferability primarily lies within the concept of using personalized customer feedback when managing the use of a DCS. In terms of study 2, the transferability lies in the possibility to apply the findings to service industries in general, since the study has found commonalities between the studied cases in a range of different service industries.

Dependability on the other hand, is ensured through the documentation of the processes concerning the data collection and data analysis. This handles issues related to the reliability of the research (Bryman & Bell, 2015). All interviews were recorded and transcribed, and field notes as well as the secondary documents used have been saved. The coding structure and nodes have been documented in the coding software.

Finally, *conformability* refers to the researcher's bias (Halldorsson and Aastrup, 2003), i.e. to what extent the values of the researcher have impacted the research process, and thus the

findings of the studies (Bryman & Bell, 2015). Conformability is strengthened through providing insights into potential biases. During the interviews and focus groups discussions, the researcher aimed to stay as impartial as possible, e.g. avoiding to ask leading questions. However, in order to collect data which would lead the research forward, the researcher at times steered the interviewees back to certain topics or questions which through the iterative interplay of literature study and data analysis had been found interesting and valuable. Thus, it is possible that the researcher missed some potentially valuable insights, since the interviews were not unstructured in nature. Complete objectivity of qualitative research is both impossible and undesirable (Bryman & Bell, 2015), and it is evident that the studies build upon the interviewees' own, subjective accounts and experiences of the studied matter. However, since the analysis of the gathered data has been discussed with both interviewees and the co-authors of the three papers, some potential biases of the researcher should have been accounted for. By assigning different roles for the authors of the papers, the risk, and impact, of biases are argued to be reduced (Eisenhardt, 1989).

3.4.3 Ethical considerations

Interviewees have participated voluntarily in the interviews and were informed prior to starting the interviews that they had the option to stop the interview at any time. Furthermore, interviewees and firms have been anonymized in the papers, and the researcher has not transferred information between the involved firms in a manner that could harm the involved firms. These procedures adhere to the four ethical principles of business research identified by Diener and Crandall (1978) and elaborated on by Bryman and Bell (2015): (1) avoiding harm to participants, (2) ensure informed consent, (3) avoiding invasion of participants privacy, and (4) ensure the absence of deception.

4 Summary of appended papers

In this chapter, a summary of the three appended papers is presented.

4.1 Paper 1

“Digitally connected services: Working with improvements through customer- initiated feedback processes”

An increasing number of manufacturing firms are advancing their offerings by providing digitally connected services in addition to, or integrated with, their product offering. Paper 1 explores the processes needed to understand and react to customer-initiated feedback of *digitally connected services* (DCS). The paper is based on a case study of a manufacturing firm which offers DCS and operates in a mature industry. Offering DCS poses novel requirements on the firm’s quality improvement processes, as well as blurs both internal and external boundaries. To explore this, the paper is guided by two research question: (1) *How do DCS alter the interfaces between service providers and customers?*, and (2) *How do DCS challenge the improvement processes of customer offerings?*. These questions approach the findings on two levels: the provider-customer interaction interface in general, and the customer feedback processes in particular.

First, the findings indicate that due to the user-centric nature of DCS, the improvement processes regarding these services need to have the ability to manage the concept of *quality-in-use*. The concept of *quality-in-use* emerges from changes in actor roles, where the customer not only is the recipient of the service, but also initiates, configures, and provides resources into the DCS. As a response, the firm needs the ability to collect and use both codified and personalized DCS customer feedback, rather than just one of the two. DCS open up a new interaction pattern between the customers and the firm, and the firm needs to be able to handle customer interactions at a significantly larger scale than has been the case with the firm’s conventional service offerings. Furthermore, DCS is positioned as highly digitalized, advanced user-centric services that support the customer, a novel combination of characteristics which calls for an extension of existing service classification. The characteristics of DCS enable the firm to receive customer feedback both through digital-to-digital, digital-to-human, and human-to-human interfaces. Thus, the firm needs to have processes in place which can capture and use the different types of customer feedback.

Second, the offering of DCS poses challenges on the firm's quality improvement processes. The characteristics of DCS emphasize both the technical and the social dimensions of the firm's feedback systems. Within the firm, one challenge is the novel constellation of organizational units involved in the quality improvement processes of DCS. Another challenge concerns the multiple pathways that customer-initiated DCS feedback can take into the organization. Furthermore, the firm's feedback processes for codified DCS feedback need to be complemented with processes that facilitate the usage of personalized DCS customer feedback. In order to react upon DCS feedback, the firm also needs to have learning processes in place, which in the paper are found to be lacking in regards to personalized customer feedback of DCS. The challenge here resides in the being able to juggle the perspective of the individual customer, which is delivered through the human-human customer-initiated feedback interface, and the abundance of codified DCS feedback digitally channeled into the firm.

4.2 Paper 2

“Use of customer satisfaction measurements to drive improvements”

As firms' intangible assets are becoming increasingly valuable, the need for non-financial performance measurements which have the ability to capture these constructs is growing. The most frequently used non-financial performance measurement is 'customer satisfaction', often attributed to the notion that an increase in customer satisfaction has a positive effect on the firm's financial performance. Furthermore, customer satisfaction has been found to be a more accurate predictor of future financial performance, than the traditional, lagging financial performance measurements. The results of customer satisfaction measurements can be used in three predominant ways: symbolic, action-oriented, or knowledge-enhancing. Even though the importance of being able to use customer satisfaction measurements as drivers for improvements is widely accepted, many firms still struggle with doing so.

On the backdrop of this, Paper 2 explores how customer satisfaction information usage processes differ between organizations utilizing the measurements in an action-oriented manner to support improvements, and organizations using them in a knowledge-enhancing or symbolic manner. Paper 2 is based on empirical data from 24 service firms operating in different service industries in Sweden. The process of customer satisfaction information usage (CSIU) is analyzed, and the paper concludes that all the studied firms would benefit from more designated activities CSIU process. Furthermore, the paper finds that utilizing customer satisfaction

measurements to drive improvements requires the combination of (1) strategic, long-term activities, and (2) concrete, reactive operationalization in response to the customer satisfaction measurement results. Merely employing the former risks leading to a symbolic usage of the customer satisfaction measurements, whilst the latter might result in a purely reactive organization, lacking proactive initiatives.

4.3 Paper 3

“Dynamic Capabilities for Improving Service Offerings through the Utilization of Customer Satisfaction Information”

Albeit customer satisfaction information (CSI) being the most commonly used non-financial performance measurement, many firms still struggle with connecting their customer satisfaction information usage (CSIU) to improvements. Previous research on CSIU has primarily focused on the phases and activities of the CSIU process, whilst the associated capabilities needed for firms to carry out the CSIU process in a manner that supports service improvements has received little attention. As CSI is an indicator of changes in customers' needs and requirements, firms need to employ capabilities which can respond to these external changes. Dynamic capabilities are capabilities with the purpose of responding to changes in the environment, and Paper 3 therefore sets out to identify the dynamic capabilities which can sense, seize, and transform the firm's resource base in response to CSI. Empirical data was gathered from 24 service firms operating in Sweden.

The contribution of the paper lies in employing the concept of dynamic capabilities as a bridge between the CSIU process and the firm's service improvements, in order to facilitate the combination of an *action-oriented* and *knowledge-enhancing* CSIU. The findings indicate that firms which predominantly employ an action-oriented CSIU have more activities in the seizing stage, whilst firms which predominantly exhibit knowledge-enhancing CSIU are more focused on the transforming stage. The two types of CSIU therefore appear to be complementary in terms of DC. Furthermore, the paper identifies four categories of organizational prerequisites for DC as they emerge from the empirical data: *incentive structures*, *leadership commitment*, *organizational culture*, and *organizational knowledge*. The prerequisites take the form of ordinary capabilities, which support the firm's DC. Moreover, these prerequisites are found to become especially important when the firms aim to move from the seize- to the transform stage in the CSIU process. Many of the studied firms struggle with institutionalizing the behaviors and actions which emerge from the CSIU, and the organizational prerequisites of having

incentive structures tied to these desired behaviors, as well as having visible *leadership commitment*, are pointed out as needed. Furthermore, it is proposed that DC for CSIU are intertwined with capabilities of market-driven organizations, and as such extend the conventional conception of DC into the provider-customer service exchange.

5 Discussion

This thesis has explored the use of customer feedback, with the aim to identify prerequisites needed to use the customer feedback for service improvements. First, the discussion will start in the firm-customer interface in the context of customer-initiated feedback provided regarding DCS, before going into the firm to explore the organizational learning processes in play. Secondly, the discussion continues to move into the firm to investigate the usage of customer satisfaction information in the context of service firms gathering customer satisfaction information. The emphasis lies on identifying organizational capabilities in play when aiming to utilize CSI for service improvements. Third, and finally, a discussion regarding the prerequisites needed to use customer feedback for service improvements is presented. The prerequisites needed will revolve around the interplay between a firm's capabilities, both ordinary and dynamic, its learning processes, and its systematic usage of customer feedback, both firm-initiated and customer-initiated.

1. What are the challenges for firms in using personalized customer-initiated feedback when aiming to improve their DCS-offering?

The main challenges for firms in using personalized customer-initiated feedback can be placed into three categories: (1) a lack of knowledge within the organization regarding how personalized customer feedback, i.e. traditional service feedback, can be used as input for DCS-improvements, (2) a therefrom resulting lack of systematic processes for using personalized customer feedback as basis for DCS improvements, and (3) the distinct characteristics of DCS which separate them from product, services, SSC, and SSP, which also needs to be mirrored in the processes handling the customer feedback related to DCS.

Offering DCS opens up for novel ways of gaining customer information and feedback, and has resulted in an abundance of codified, digital data which to a large extent is automatically transmitted to the firm when the customer is using the DCS (McAfee et al., 2012). One of the main research priorities in service research has been argued to be to understand how firms can utilize this abundance of codified data, often referred to as big data (Ostrom et al., 2015). Thus, one of the main challenges for firms offering DCS is connected to how firms can make sense of the vast amount of codified customer feedback (Ostrom et al., 2015). Therefore, a large amount of research focuses on customer feedback which is delivered in the digital-digital interface (e.g. McAfee et al., 2012). However, when studying a firm's feedback channels of

DCS in paper 1, one significant finding points to the lack of structured processes which deal with the personalized customer feedback, delivered through a human-human interface. The firm did not expect the vast increase in personalized feedback when offering the DCS, thus stood unprepared when the surge of incoming personalized feedback occurred. Rather, the firm assumed that due to the digital- and connectivity-related characteristic of the offering, DCS-improvement processes would rely on codified feedback. The different types of feedback are illustrated in figure 7, where the focus of the firm in terms of processes for customer feedback was more or less solely focusing on the left side of the matrix, the codified feedback gathered through the sensors and software of the DCS, whilst the personalized and passive feedback, illustrated on the right-hand side of the figure, was neglected.

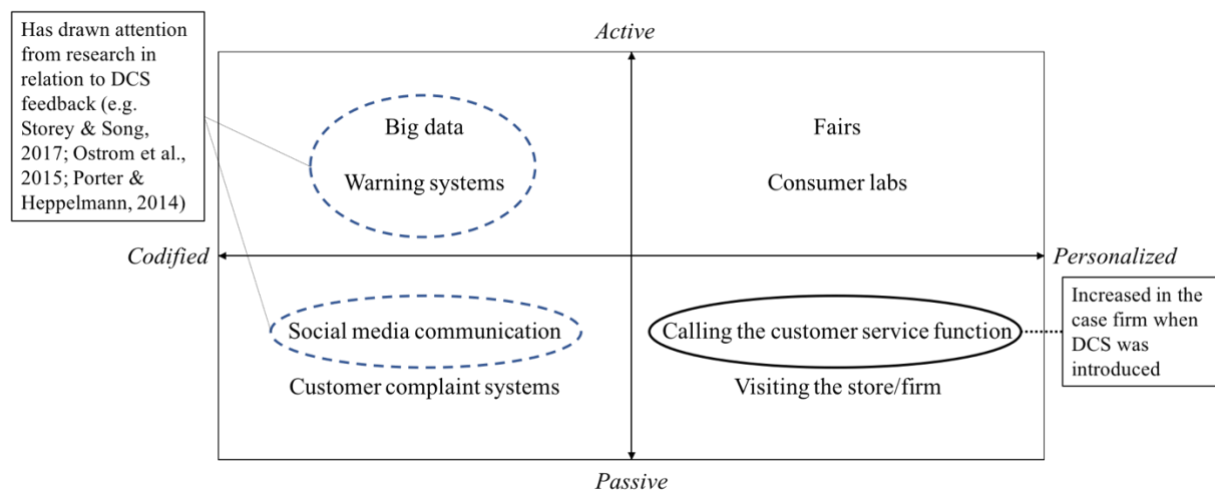


Figure 7: Theoretically driven and empirically driven mapping of DCS customer feedback, with categorization adapted from Fundin and Elg (2006)

With the extensive focus on codified customer information related to digitalized offerings and the customer experience associated with its use (McAfee et al., 2012), it appears that both practice and research neglect the potential of utilizing personalized customer feedback for DCS improvements. Since DCS opens up the possibility for a two-way communication between firm and user (Dellarocas, 2003), who in a B2C-context often also is the costumer, thus possessing processes for utilizing both codified and personalized customer feedback, as well as being able to employ information gathered from both the digital-digital interface, as well as the human-human interface, will provide firms with the most comprehensive basis for DCS improvements.

Furthermore, examining the characteristics of DCS in order to identify where DCS fit in terms of service typologies, paper 1 proposes an extension of the service-typology developed by Mathieu (2001) due to the unique characteristics of DCS. Mathieu (2001) classifies services

based on if their purpose is to support the product, or if the purpose of the service is to support the customer when using the product. DCS, however, shares characteristics with services supporting the client (Mathieu, 2001) aiming to facilitate the customers use of the service, whilst also being digitalized, meaning that the service delivery occurs through a digital interface and is connected to both the firm and the customer through internet connectivity (Porter & Heppelmann, 2014). The technological development which has enabled the emergence of ‘smart’ products, has resulted in that many manufacturing firms have been thrown into the deep end of the pool in terms of servitization, since smart products per definition deliver DCS – services which are focused on facilitating the customers’ *use* of the products. Therefore, the delivery of DCS is a driver for how manufacturing firms are increasingly delivering *value-in-use* rather than *value-in-exchange* (Vargo, Maglio & Akaka, 2008), a change which is calling for processes that can continuously gather and utilize customer feedback. Furthermore, through DCS firms establish a potentially continuous connection and interaction between the provider firm and the customer (Porter & Heppelmann, 2014). These ‘novel’ characteristics of DCS through the combination of service elements and a digital delivery system can be analyzed with the aid of *sociomateriality*, a concept and research stream dealing with the inseparability between the social and the technical (Cecez-Kecmanovic et al., 2014). As smart products, and thus the delivery of DCS, become an increasingly embedded part of the firm’s customer offering (Porter & Heppelmann, 2014), the sociomateriality aspect needs to be considered in terms of how it will impact the customers’ perception of the offering, as well as employing feedback processes that can accurately capture this information in order to ultimately conduct service improvements.

Due to the inseparability of the technical and the social (Cecez-Kecmanovic et al., 2014) in the delivery and experience of DCS, processes and capabilities which can handle both the abundance of codified customer feedback (Porter & Heppelmann, 2014) as well as feedback which captures the social aspects of the DCS-use experience, which in this research takes the form of personalized customer-initiated feedback, is called for. This duality therefore calls for systematic processes which can deal with two types of knowledge: (1) tacit knowledge, converted from personalized feedback information delivery, and (2) explicit knowledge, converted from codified feedback information generated and delivered through built in sensors, software, and connectivity elements. The former types of systematic processes appear to be lacking in some manufacturing firms today, as was discussed in paper 1. Another difference between the two types of knowledge processes which were discussed in paper 1 are the number

of knowledge conversion modes, where the personalized DCS customer feedback only passed one knowledge conversion mode in the firm, in contrast to the codified customer feedback which was channeled through multiple knowledge conversions modes. Thus, the knowledge conversion modes of *externalization*, where tacit knowledge is converted into explicit knowledge, as well as the knowledge conversion mode of *combination*, where explicit knowledge is refined and developed, are lacking for personalized DCS-feedback. Since the organizational knowledge creation is built upon the process of making knowledge *available* within the organization (Nonaka & von Krogh, 2009), e.g. through converting it into aggregated information accessible throughout the organization, the firm is failing to build knowledge from issues which customers deem important to the extent that they seek out to contact the firm. Another challenge of building knowledge around the customers' use of DCS, stems from the complex relationship between the experience of the individual user and the aggregated user information readily available through automated sensor-generated data. Due to the service aspects of DCS, and the therefrom stemming co-creation of value, the firm cannot be expected to fully know which aspects of the DCS delivery that they should gather customer feedback from. Therefore, solely relying on codified customer feedback, which the firm analyses and converts based the organization's knowledge of the DCS customer journey, is insufficient when aiming to improve services. Thus, there is a need for channels into the organizations where customers can provide feedback regarding their unique experience of the DCS, and processes which can covert the individual customer's feedback into aggregated organizational knowledge upon which service improvement processes can be based.

2. How can the use of customer satisfaction information (CSI) for service improvements be supported?

In order to respond to external market changes, gathering market information is the first, crucial, step. In the day and age of big data, an abundance of codified, sensor-driven, thus often automatically captured and transmitted, information, an information overload is negatively affecting many firms (Ostrom et al., 2015). Firms have never before had access to as much customer information as they have the possibility for today (McAfee et al., 2012), at the same time, however, customers' wishes and requirements are growing increasingly complex (Ostrom et al., 2015). Whilst paper 1 explored personalized, customer-initiated feedback, papers 2 and 3 explore the use of customer satisfaction information (CSI), one of the most complex

(Davenport et al., 2001), but also important in terms of being able to predict future financial performance (Ittner & Larcker, 1998), types of market information.

Firms which aim to utilize CSI as basis for service improvements, should strive for employing an integrated approach of both action-oriented and knowledge-enhancing CSIU, as was proposed in paper 2. The capabilities needed for this approach, as explored in paper 3, are a combination of organizational, i.e. *ordinary*, capabilities, combined with dynamic capabilities. Since dynamic capabilities (DC) aim to transform the firm's existing resource base as a response to external market changes (Teece et al., 1997), which can be detected for example through CSI, they are a suitable vehicle for CSIU. However, the more general and overarching characteristics of DC need to be operationalized through capabilities which are suitable for working in the interface of firm and customer, e.g. through market-oriented capabilities which serve the purpose of enhancing the firm's knowledge regarding its customers (Day, 1994). Thus, market-oriented capabilities (Day, 1994) orchestrated through DC can serve as a bridge between the customer and the firm, thus working as microfoundations (Teece, 2007) of sensing, seizing, and transforming firms CSIU-resources.

The ordinary capabilities, e.g. visible leadership support, possessing an organizational culture which emphasizes the importance of working with having satisfied customers, and incentive structures tied to the results of CSI, serve as facilitators, enablers, or disablers, of the studied firms' microfoundations. These microfoundations refer to having systematic processes for analyzing and disseminating CSI, and in extensions, the firms' dynamic capabilities. There appears to be an iterative relationship between the more static, ordinary capabilities and the firms' DC, where for example *visible leadership support*, and *incentive structures tied to the results of CSI* facilitate the microfoundations active in the sensing, seizing, and transforming phase of the firms' CSIU. In order to achieve a CSIU which both emphasizes concrete action, i.e. an action-oriented (AO) CSIU, as well as an approach which enables strategic, long-term, knowledge building, i.e. a knowledge-enhancing (KE) approach, activities in the seizing and transforming phase need to be systematically present in the firms. Possessing this complementary approach of *AO + KE* empowers firms to both be reactive and proactive in terms of their CSIU.

6 Conclusions and future research

Underpinning the ability to utilize customer feedback, irrespective of if it is customer- or firm-initiated, are organizational learning activities, structures, and processes. The building blocks of a firm's DC, i.e. the firm's microfoundations, are the distinct skills (Teece, 2007) of the organization, which accumulate to the organization's knowledge, resulting in organizational routines (Morgan, Vorhies & Mason, 2009) that enable the firm to utilize the customer feedback in a manner that improves the service offering, thus subsequently increasing customer satisfaction. The common denominator for using customer-initiated customer feedback for service improvements and using firm-initiated customer feedback for service improvements, therefore lies in the firm's capabilities as well as its ability to accumulate knowledge and to learn.

Challenges of using personalized DCS – The need for designated processes

Due to the distinct characteristics of DCS, such as the connectivity aspect (Porter & Heppelmann, 2014), the human-digital interface, and the therefrom stemming inseparable integration of the digital and the human (Cecez-Kecmanovic et al., 2014), treating the feedback processes connected to them in the same manner as a product-, or service-feedback, runs the risk of missing vital feedback regarding the customers user experience. The abundance of codified feedback has the allure of being a customer-oriented organization's gold mine, in terms of understanding how customer use the service (McAfee et al., 2012). However, due to the inherent service aspect of a DCS, there is still a need for firms to gather and systematically process passive, personalized customer feedback. The challenges for firms in doing this, appear to be threefold: first, a lack of knowledge within the organization regarding the importance of basing DCS improvements on a combination of codified and personalized customer feedback, as was showcased in the paper 1, where the firm was unprepared for the surge in passive, personalized customer feedback after the introduction of DCS. Second, due to the lack of knowledge regarding the potential of utilizing passive, personalized customer feedback as input for DCS improvements, there is lack of systematic processes within the firm, for channeling and utilizing this type of customer feedback. Third, naturally – if there is a lack of systematic processes for channeling and utilizing personalized customer-initiate feedback, individual (in the studied firm mainly customer service) employees become knowledge carriers of the personalized feedback. Thus, the organization fails to systematically learn from the customer feedback, since the tacit knowledge is not converted into explicit, codified knowledge. This

risks being problematic for the firm, since explicit knowledge is easier to spread widely throughout the organization.

Supporting the use of CSI for service improvements – The CSIU process, usage type, and associated capabilities

Working with CSI is often perceived as a complex matter (Lervik Olsen et al., 2014), and the studied service firms showcase a low maturity in their CSIU-process due to the absence of activities in especially the first CSIU-phase, the strategy phase, and the third and final phase, the analysis and implementation phase, as was reported in paper 2. The lack of activities in the first and third phase of the CSIU-process, lead to that the studied firms fail at incorporating CSI in their improvement processes. Furthermore, due to the need for the CSIU-process to provide both concrete action, and reaction, on the CSI received, as well as providing long-term strategic change, i.e. facilitating a more proactive CSI-approach, the combination of an action-oriented and knowledge-enhancing usage was suggested in paper 2. Also, when exploring the capabilities needed for using CSI as input in the improvement process in paper 3, market-oriented capabilities (Day, 1994) were deemed suitable to aid in operationalizing the overarching dynamic capabilities of sensing, seizing, and transforming the firm's asset as a response to external changes, i.e. customer information (Teece, Pisano, & Shuen, 1997).

Conclusively, both in terms of firm-initiated feedback in terms of CSI, as well as customer-initiated feedback in terms of personalized DCS feedback, the three papers in this thesis have shown a lack of systematic processes for using these types of customer feedback in the service improvement processes. Furthermore, these systematic processes are suggested to be supported by organizational learning mechanisms consisting of systematic knowledge conversion modes (Nonaka, 1994). Due to the nature of the passive, personalized DCS customer feedback studied in paper 1, the knowledge conversion mode of externalization, transforming tacit to explicit knowledge, is of especial importance, if firms seek to be able to systematically use the feedback. For active customer feedback in terms of CSI, there is a need to translate the feedback into information that is perceived as relevant, timely, and actionable by the employees (Morgan et al., 2005). Here as well, having learning mechanisms in place which facilitate a knowledge-enhancing CSIU is of importance. Regardless of customer feedback type, firms rely on ordinary and dynamic capabilities when utilizing customer feedback for service improvements. Thus, developing the microfoundations underpinning these capabilities needed to support the firms in the customer feedback usage is crucial. Employing systematic processes which are supported

by knowledge conversion modes, dynamic capabilities, and the bridging microfoundations, emerge as prerequisites for using customer feedback for service improvements.

The *theoretical contributions* of the thesis focus on enhancing the understanding of the state of art of CSIU, as well as exploring how CSIU can be supported through the lens of dynamic capabilities, its microfoundations, traditional ordinary capabilities, and learning mechanisms. Furthermore, the use of personalized, passive customer feedback regarding DCS is explored, which – despite the popularity of DCS related research – is a topic with little investigation. It is pointed out that from a sociomateriality standpoint, the human cannot be separated from the digital when the customer uses the DCS, thus relying on only codified, and digitally generated customer feedback might fail to incorporate the human experience.

The *managerial implications* are of interest for firms providing DCS, in terms of identifying and aiming to overcome challenges related to utilizing personalized, customer-initiated feedback for their DCS offering. Moreover, due to the widespread use of customer satisfaction measurements, the insights into the CSIU process, as well as the capabilities and learning mechanisms supporting the CSIU process, can be of value for many firms.

Future research

Even though this thesis has centered around the use of customer feedback, the studies have all focused on the provider firms and their internal processes, capabilities, as well as on the interface with customers. Therefore, it would be interesting to conduct a study which also includes the customers' perspectives and their perception of DCS. Another interesting path for future research is to further explore the sociomateriality (e.g. Cecez-Kecmanovic et al., 2014) of DCS, and the implications this has on both firms' customer feedback processes, as well as the capabilities, needed to deliver DCS in a manner that satisfies firms' customers. It is argued the social and the material are inseparately intertwined (Orlikowski & Scott, 2008), which implies that these two aspects cannot be separated when customers judge the value and quality of the DCS-offering. The concept of sociomateriality and its assumptions about the social and the technical opens up for further in-depth understanding of mechanisms underlying development and improvement of DCS. This could be done by utilizing focus groups, as well as in-depth interviews, with DCS users. The selection of customers would be challenging for two predominant reasons: (1) getting access to customers, and (2) ensuring that the customers are representative for the DCS user base – or at least clearly belong to a specific DCS user

segment. To counteract the second challenge, it might be beneficial to find customers belonging to different age groups, and different types of user (e.g. sorted by frequency and type of use).

Furthermore, employing processes which can capture DCS customer feedback in regards to many aspects of the DCS experience is an important aspect for firms delivering DCS. It might therefor prove beneficial to employ a sociomateriality approach to a study regarding the customers' DCS experiences, since the social and the material are studied together and not separately. Accordingly, in the increasingly digitalized society (Cecez-Kecmanovic et al., 2014; Porter & Heppelmann, 2014), since the sociomateriality of the firm's internal processes consists of an interplay between human and digital interfaces, e.g. using digital tools when converting tacit knowledge received by a customer service employee into explicit knowledge in a digital system, this could also present an interesting avenue for future research.

Ultimately, if firms lack the organizational and dynamic capabilities needed to convert customer feedback into service improvements whilst also ensuring that the gained knowledge is added to the organizational knowledge bank, firms will experience difficulties satisfying their customers. Further research into the relationship between the needed capabilities for utilizing CSI and other types of customer feedback as basis for service improvements, would be beneficial both from a theoretical and a managerial viewpoint. One specific research issue which would be interesting to pursue concerns mapping the concrete processes which link the firm's learning processes with its distinct set of market-oriented capabilities and its service improvement processes. Thus, adding on to the work done in this thesis, one natural next step would be to explore the actual improvement processes and determine which capabilities and learning mechanisms that are in play.

Lastly, the concept of quality management has entered a new day and age within the context of servitization and digitalization. Being able to understand, and improve, the satisfaction of one's customers has become increasingly important in the economy of intangibles (Fornell, Morgeson III, & Hult, 2016). Furthermore, since DCS today are offered by both traditional service firms and traditional manufacturing firms (e.g. banking and automotive both offer mobile applications), both industries are entering an unknown realm, where industry boundaries become blurred and many interesting research paths are emerging. Moreover, exploring the new costume of quality management in the age of servitization and digitalization would be interesting. Which quality management competences are needed when working with improving

the DCS offering? Which skills and processes, practices and procedures, do firms need when aiming to take feedback from the customer-firm interface, or customer-DCS interface, into the different functions within the firm, whilst also transforming the feedback into organizational knowledge, and using it for improving their offering? Also, quality management itself, with its main principle of *customer focus* and its associated practices and techniques, might aid organizations in releasing the potential that digitalization in combination with servitization offers. It is safe to say, however, that digitalization in combination with servitization will continue to transform the way firms work both internally and externally, which paired with the continuous topical issue of how organizations learn and develop capabilities, results in plentiful of intriguing research paths to take moving forward.

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